REMARKS

The Non-final Office Action dated November 13, 2003 has been received and its contents carefully noted.

Claims 18 - 38 are pending in the application.

Claims 35 -38 are allowed.

Claims 23 - 34 are objected to but indicated to contain allowable subject matter.

Claims 18 - 22 are rejected.

The Examiner has approved the proposed drawings and corrections filed on 27 October 2003.

As a result, Applicants respectfully request entry of the above amendments in response thereto. The following comments are offered on the cited prior art and it is trusted that they will be persuasive in bringing about a favorable reconsideration and allowance of the existing claims.

Claim Rejections - 35 U.S.C. §103

Turning now to the rejections under 35 U.S.C. § 103(a), claims 18 - 22 have been rejected as being obvious over Chien (U.S. Patent No. 5,806,960) in view of Chien (U.S. Patent No. 5,775,016). Applicants respectfully disagree with these rejections for the following cogent reasons.

Applicants respectfully disagree with the Examiner's conclusion that it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the EL

panel stripe in any place needed in buildings as taught by Chien '016, into Chien '960 in order to extend the El panel stripe as desired for safety or esthetical vision purposes.

Applicants' invention as disclosed and claimed targets connecting a substantial distributed emergency lighting system made up of for example, the EL panel stripe, the EL exit sign and the DC voltage source, to the AC power grid which is in the building. The invention also contemplates connection to the fire alarm/emergency alarm system in the building and therefore can respond to either building emergencies such as fires or power outages through these connections and because of the design of the system. Neither Chien patents ('960 or '016) disclose, suggest or teach means connecting to the building power system or the building emergency system in order to be able to respond to a building emergency or power outage.

Both Chien patents describe small battery-powered self-contained systems that are specifically designed not to be connected to the power grid. See for example, Chien '960: Column 1, lines 20 – 21; Column 2, lines 66 – 2; Column 3, lines 8 – 13; Column 7, lines 66 – 5; Column 8, lines 41 – 43; Column 9, lines 41 – 45; Column 10, lines 48 – 59; and Chien '016: Column 1, lines 36 – 41; Column 2, lines 67 – 4; Column 3, lines 23 –26; Column 3, lines 46 – 50; Column 4, lines 1 – 3; Column 5, lines 9 – 19; Column 5, lines 60 – 62; Column 6, lines 55 – 62; Column 7, lines 51 – 55.

Applicants submit the only conclusion one can draw is that all versions of a hypothetical combination of Chien '960 and Chien '016 would result in a series of small, self-contained

subsytems, which would be battery operated, and would be independent from each other and from the power grid and fire/emergency systems.

Applicants further disagree with the Examiner's assertion that Chien '016 (col.2, lines 41 – 67, and col. 3, lines 1 – 15 and 23 – 29 and Figures 1 – 17) in combination with Chien '960 would enable one of ordinary skill in the art to create an emergency lighting system equivalent to that of Applicants' invention. In the referenced text, Chien describes his view of the advantages of super thin EL and PL lighting elements over conventional lighting (eg. incandescent, or LEDs) including: 1. Flexibility, to allow them to bend around contours and to be able to walk on them; 2. The ability to be shaped and printed on, to provide additional information; 3. A wide a variety of colors for attractiveness and avoidance of confusion with other warning signs; 4. Low power consumption in the case of EL which enables the EL elements to be powered by an inexpensive battery pack without the need for connection to the power grid and zero power consumption for the PL elements; 5. Low assembly and installation costs. Chien also goes on to say that, both PL and El strips have advantages and disadvantages and his intent is to provide an illuminated safety guide for use in illuminating indoor passages, which does not require wiring to each installation and which is not likely to be broken by shocks, etc.

Chien '016 specifically describes the objectives of his invention, which specifically includes "provide an illuminated safety guide for use in illuminating indoor passages such as aisles, corridors, hallways and stairwells which does not require wiring to each installation and which is not likely to be broken as a result of shocks …". Accordingly, the only conclusion that

can be reached is that Chien '016 discloses a self-contained, battery-operated combination EL/PL illuminated safety guide.

Further referring to Figures 6, 16 and 17 in Chien '016 demonstrates Chien's intent for locating his self-contained systems in a building. <u>Chien has stated that it would be very expensive, if at all possible (col. 1, lines 40 – 41, col. 3, lines 1 – 3, col. 3, line 25, col. 5, lines 60 -62) to connect the building power grid to every fixture and therefore rejects that as an option.</u> Close scrutiny of Figures 6, 16 and 17 illustrate placing self-contained systems on the floor, on the horizontal portion of steps in a stairwell, mounted on a door and mounted on the walls at various heights. Trying to run power from the building power grid to most of these individual units would be expensive in new construction and close to impossible in existing buildings and is therefore not an option. In addition, state and local fire codes would prevent Chien from placing EL strips directly on the floor for several reasons: First, these systems are required to be in fixtures which have a nominal thickness and will increase the thickness enough that people will trip over them unless they are buried into the floor increasing costs. Second, the systems will not be allowed to be installed unless they conform to know safety standards such UL 1994 , "Low Level Path Marking and Lighting Systems", in which Chien's system does not comply. Third, these systems are independent from each other and from the building power grid and fire/emergency systems limiting their usefulness. Thus, Chien would need to modify the system to operate in a manner not taught, suggested or disclosed to replicate Applicants' invention as disclosed and claimed.

In contrast, Applicants' distributed emergency lighting system as disclosed and claimed, is designed to be installed in a small or large building with one or multiple floors. As such the system is designed to provide emergency egress if either a portion of the building experiences a problem or if the entire building experiences a problem. For instance, an emergency alarm would normally impact the entire building, but a power outage may be local to a given area of the building. Either way, Applicants' invention as disclosed and claimed will respond appropriately to provide emergency egress lighting. Any version of a hypothetical combination of Chien '960 and Chien '016 could not respond to a building emergency because there are no connections between the independent battery operated subsystems and either the building fire/emergency system or the building power grid. Not only does Chien elect to stay clear of the building power grid, he also does not disclose, teach or suggest any method that might connect his system to the power grid. Therefore, one of normal skill in the art cannot decide to connect to the building power grid without extensive circuit redesign. Chien also does not disclose the intent or method of using a battery back-up system which must be utilized if he were to connect his system to the building power grid. Furthermore, Chien does not disclose teach or suggest the intent or method of how to connect an external signal to his battery-operated self-contained EL lighting system. This includes the problem that the systems are independent from each other and there is no disclosed intent or method that would allow the systems to operate together.

Further, applicants bring to the Examiner's attention that the independent self-contained sub-systems disclosed by Chien ('960 & '016), must be small because of limitations to such a system, some of which are disclosed and some of which are not. The maximum size of any system disclosed by Chien is approximately 172 square inches, which is approximately 13" X

13" in size (Chien 016, col 4, line 2: 100 mA max divided by 0.09 mA/cm^2 = 1111.11 cm^2 = 172.2 sq. in. = 13.1" X 13.1" panel). This limitation is not arbitrary for the following reasons:

- The inverter circuit disclosed by Chien is designed to have the fewest parts for small size. It is a flyback design and not very efficient as an EL driver. This type of driver is typically 40% to 50% efficient. Therefore, it cannot be expanded to larger size systems because of the tremendous accompanying heat losses. This would then require a larger and more expensive enclosure and possibly require cooling vents or fans for each subsystem.
- Attempts to expand this inefficient design would require larger batteries. This would again require a larger and more expensive enclosure and would increase maintenance costs for replacing batteries.
- The EL lamps themselves are not defined and are thus assumed to be typical of what was available at the time of the invention disclosure. Typical EL lamps themselves have a size limitation inherent in their design. They are typical parallel plate EL lamps, which have a definite maximum size due to power dissipation effects. The typical parallel plate EL construction is a follows:
  1. A transparent indium tin oxide coated polyester front substrate (ITO/PET). The indium tin oxide coating (ITO) is conductive, but is not a perfect conductor and therefore has some inherent resistance.
  2. A coating of EL phosphor crystals embedded in an organic binder, usually screen printed, coated onto the ITO surface of the front substrate.

3. A coating of barium titanate particles embedded in an organic binder, usually screen printed, coated over the phosphor coating.
4. A conductive coating or ink, such as silver ink, usually screen printed, coated over the barium titanate coating.

The resulting EL lamp is basically a light-emitting capacitor with ITO as the front electrode and the rear conducting layer as the rear electrode (eg. silver ink). Connectors with leads are attached to the front ITO electrode and the rear conducting electrode and connected to an AC power source to illuminate the EL lamp. In this typical parallel plate EL configuration, the lamp cannot get too large because current dissipates in the front indium tin oxide (ITO) electrode, due to its inherent resistance. This causes the lamp to lose brightness as the distance from the connector increases. Therefore, the lamps themselves cannot be very large in order to stay uniformly lit.

The results of the limitations listed above lead to a conclusion that any system, which is a combination of the two Chien patents ('960 & '016), will by necessity be a large number of small independent battery operated subsystems.

The length of the strip lamps, as disclosed by Chien, for highlighting aisles or passage ways would be relatively short in the range of 12" – 15" long by possibly several inches wide if it is an EL only solution. In order for Chien to highlight a single 100 foot long aisle in a building, he would need approximately 80 to 100 individual lamp fixtures placed end-to-end. If these lamps are self- contained systems as disclosed by Chien, with on-board inverters and

batteries, then Chien would need 80 to 100 independent battery-powered subsystems to highlight a single aisle. The number of subsystems he would need to do an entire building becomes staggering. In contrast, Applicants' emergency lighting system as disclosed and claimed requires for example, one lamp 100 foot long in an extrusion, with two connections. In addition, for even higher reliability, the 100 foot lamp can be connected at both ends to provide redundant connections.

If it is attempted to use a combination of EL and PL as disclosed by Chien '016, the fixtures possibly could be larger than 12" – 15" long, if individual strips of EL were cut out and mounted on a PL sheet. But the resulting assemblies would be very expensive because of the labor costs for mounting and connecting the multiple EL strips in every subsystem. The system would also be inherently unreliable because of the multiple connections to each EL strip. In addition, the PL component typically has very low emission characteristics and would provide little or no useful illumination in an emergency.

Accordingly, the combination of the Chien patents ('960 & '016) as suggested by the Examiner if such a combination could be made, will by necessity be a large number of small independent battery operated subsystems. This results in a hodgepodge collection of independent battery-powered self-contained subsystems that can not work in concert and can not be triggered by any building wide event, because there is no disclosed intent or method to tie these to the building power grid or emergency systems. Therefore, these subsystems cannot power the EL lamps to illuminate at the time of building emergencies or power outages. If they can not be triggered to come on when needed, then they must be on all the time. If the EL lamps

are on all the time, then they will suffer from several problems some of which are discussed in the following.

- Because the subsystems are battery powered by design, the batteries will need to be changed frequently. For example:

Chien discloses that his typical El lamp draws 0.09 mA/cm^2. Applicants have shown that Chien discloses a simple EL driver circuit that minimizes circuit size and is a flyback design. Applicants have also noted that Chien's design is very inefficient in the range of 40 – 50%. It is estimated that the consumption at the battery is 0.019 Watts/ cm^2, which = 0.123 Watts/in^2. Thus for a small 10 square inch lamp the required power would be 1.23 Watts. If two penlight alkaline batteries were used (rated 2800 mA hours), the circuit would draw 410 mA and they would be depleted in 5 – 6 hours (there is some loss of battery capacity due to the relatively high current drain rate). Or, if four batteries were used, they would be depleted in approximately 10 – 12 hours. There would also be a significant drop in lamp brightness as the batteries are depleted.

If the maximum listed lamp size of 172 sq. in. were to be powered, then 172 X 1.23 = 21.2 Watts would be dissipated. If four 1.5 volt D-cell alkaline batteries were used (rated 15 A hours) they would draw 3.53 Amps and be depleted in approximately 3 - 4 hours (there is some loss of battery capacity due to the relatively high current drain rate). Or, if eight batteries were used, they would be depleted in approximately 6 – 8 hours. The net result of these calculations demonstrate that using self-contained battery-powered systems for building applications is clearly not commercially viable.

▪ The EL lamps have a lifetime issue because they experience an exponential decay in brightness when powered. The rate of decay is dependent on several factors, but primarily dependent on the driving voltage and frequency of the AC inverter. One measure on lamp life is called half-life, that is, the time its takes an EL lamp to reach 50% of its initial brightness. In many applications the useful life of an EL lamp is longer than its half life, but in safety applications that may not be the case. Typical half life values for EL lamps driven at full brightness of 15 – 25 foot-Lamberts may be 1200 to 2500 hours. Lamps at half that brightness may approach 5000 hours or more. Either way, lamps which are powered continuously, will eventually lose sufficient brightness that they will need to be replaced. There are 8760 hours in a year. Thus, continuously powered EL lamps may need to be changed approximately 1.5 to 7 times per year in every self-contained subsystem if the brightness of the EL lamps at half life is the minimum acceptable brightness. This becomes especially onerous if one uses Chien's EL/PL combined panels, where one must replace each individual EL strip mounted on a PL panel or change the entire PL panel with EL strips attached.

Chien discloses possible on-board mechanical or electrical switches as part of his self-contained battery-powered systems, which are sensitive to conditions ie. ambient light, vibration, humidity, heat, sound, tilt, movement of a rolling ball (Chien '960, col. 3, lines 55 – 59). As such they can be used for novel special effects as Chien discloses for flashing, chasing, steady-on, fade-in/fade-out, random, etc (Chien '960, col 3, lines 62 – 62). Chien does not teach, suggest or disclose the intent or the ability to use these on-board sensors for sensing building

emergencies in order to illuminate the EL elements of his invention. Chien does not disclose either the intent or the method for connecting to a building emergency system and being able to accept multiple signal types or for connecting to a building power grid. Either of these would require a safety system that was integrated into the building emergency systems, which Chien strictly rejects. Without the intent or method one cannot assume connecting to a building emergency system or building power grid, because there are many technical issues which need to be solved and Chien does not disclose, suggest or teach them. And, Chien does not disclose a method for communicating with a building's emergency system or its power grid for the purpose of triggering an EL lamp to go from the non-illuminated state to the illuminated state without operator intervention.

The system disclosed by Chien '016 is unreliable as a large scale building safety system. As mentioned above, any system which is a combination of the two Chien patents ('960 & '016) if such a combination can be made will by necessity be a large number of small independent battery operated subsystems. As discussed above, the systems are not tied to any building system and cannot respond to building emergencies and therefore need to be on all the time, and that furthermore, having the system on all the time would require very frequent battery changes and somewhat less frequent EL lamp changes. Thus, any resulting safety system combining Chien '960 and '016 would have a very high maintenance cost for both the labor of constantly changing batteries and EL lamps and the cost of the batteries and the EL lamps themselves.

- Furthermore, the small subsystems may have different replacement schedules for batteries and lamps and at any given time, some number of the subsystems could be requiring service at any given time such as during an actual emergency. If that is the case

the safety of the system would need to rely on the PL strips, not the EL strips, which are not nearly as visible as EL strips.

- Furthermore, any resulting safety system combining Chien '960 and '016 would not represent a failsafe system, because, a large number of independent battery operated subsystems, which do not have diagnostic or alarm features for detecting and reporting problems with their functioning, would need to be constantly monitored.
- Furthermore, any resulting safety system combining Chien '960 and '016 would rely on the PL strips for highlighting an egress pathway if the EL strips are unable to light up. This is also an unreliable system for several reasons. 1.) As Chien has disclosed, many of the potential sites for these subsystems would be placed in areas of poor lighting such a hallways and stairwells. In these particular locations, the light energy to charge up the PL light strips is marginal, resulting in much dimmer and shorter duration PL activity if the lights go out. 2.) Because there is no provision for dealing with darkened rooms or hallways after business hours, people who are in the building during off-hours may find that the PL strips have completely discharged and are of no use. 3.) The actual light output for PL strips is so much dimmer that EL strips that they are only marginally useful, if at all, and would not be visible in smoky environments, even where there is stratification of the smoke. Below is a comparison of EL to PL for luminance.

EL strips in the Applicants' invention have a typical luminance value of 3 – 5 foot-lamberts (FL), but could be as bright as 20 - 25 FL. This system with EL strips is connected to the building's emergency system and the building's power grid. In an emergency or power outage, the EL strips will become illuminated and stay illuminated for a minimum of 90 minutes,

because the system has an on-board battery back-up system. The luminance after 90 minutes will be at approximately 90% of the luminance at the start. 3 - 5 FL luminance values were tested in a smoke chamber and have proven to be effective luminance values for visibility as would be needed for emergency egress applications.

PL strips require bright ambient lighting to emit brightly when the power is off, but even the brightest PL strip is much dimmer than an EL strip at 3 – 5 FL. In addition, PL strips quickly drop to a fraction of their initial luminance in a matter of minutes after the lights are shut off. After 90 minutes, the PL strips are at 2.5% to 10% of their initial value, depending on the ambient brightness of the room and the length of time the ambient lights were on to charge the PL strips before a power outage. (See attached PL specification sheet). This makes them very ineffective for marking an egress passageway in the event of a building emergency and particularly ineffective in fire and smoke.

The table below shows the comparison between EL and PL strips. Much of the data is taken from the two attached specification sheets from PL manufacturers with all values converted to foot-lamberts (FL). (Note: mcd/m2 is milli-candela per m2 = candela/m2 multiplied by 1000. I FL = 3.426 candela/m2.) The PL material from Luna is advertised as a high performing PL material that outperforms typical zinc-sulfide PL material. The notes below the table indicate how long the PL material was exposed to ambient lighting and for several ambient brightness levels.

Applicants measured the ambient lighting of a hallway and found the it to be between 50 and 150 lux on the floor, depending on where the measurement was taken in relation to the closest light fixture. The 50 lux reading was taken in a location with indirect light only, as would be typical in a stairwell. What these results show is that PL lighting has significantly lower luminance at one minute and rapidly degrades to virtually unmeasurable luminance. At one minute, the best PL luminance values are 6.6% - 24.1% of the EL luminance at 3 FL and the best PL luminance values are 4.0% – 14.5% of the EL values at 5 FL. At 10 minutes, the best PL luminance values are 1.6% - 2.6% of the EL luminance at 3 FL and the best PL luminance values are 0.9% – 1.6% of the EL values at 5 FL. At 90 minutes, the best PL luminance values are 0.14% of the EL luminance at 3 FL and the best PL luminance values are 0.09% of the EL values at 5 FL. It must be reiterated that the lowest PL values in the table, which were exposed to 200 lux, overstate the actual measured lux values that would be found in some building hallways. As a result, the actual PL performance in some building hallways would be even lower than the lowest percentages listed in the above comparison. In addition, this comparison was done with the high performance Luna PL material, which as the table indicates, is significantly brighter that other PL materials, such as the Glo-Brite

The above analysis shows that reliable EL egress lighting is vastly superior to PL egress strips to the point that the PL strips do not provide functional luminance of egress passageways initially and do not provide any measurable luminance after only minutes of being activated. This is particularly true in smoke filled environments when rapid egress is essential for preventing injury or death.

Table - Comparison of Luminance Values for EL vs. PL Strips

Lights On || Elapsed Time - Lights Off

Mfg.	Type	Room Ambient		Initial	10 Min	60 Min.	90 Min
E-Lite	EL	NA		3.0 – 5.0	3.0 –5.0	2.8 – 4.7	2.7 – 4.5
Luna	PL	1000 lux		0.724	0.076	0.010	0.004
Luna	PL	500 lux		0.339	0.055	0.009	0.004
Luna	PL	200 lux		0.198	0.045	0.008	0.004
Std. ZnS	PL	1000 lux					
Std. ZnS	PL	500 lux					
Glo-Brite 7520	PL	-		-	0.009	0.001	-
Glo-Brite 7530	PL	-		-	0.015	0.002	-

All Units in Foot - Lamberts

Notes: 1. 1000 lux – 5 minute exposure

2. 500 lux - 24 hour exposure

3. 200 lux - 24 hour exposure

In conclusion, any combination of battery-operated self-contained safety lights as disclosed by Chien in '960 and '016 do not teach, suggest or disclose the distributed emergency

lighting system of Applicants' invention as disclosed and claimed, for commercial viability, for cost, for performance, for reliability, for longevity, functionality and for failsafe operation.

With regard to claim 19, Chien does not disclose the intent or method to have his self contained battery-operated EL safety light be compliant with UL 1994 for Low Level Path Marking and Lighting Systems. Applicants' EL egress system as disclosed and claimed describes a system which is compliant with the requirements for UL 1994. Chien does not disclose the intent or method of mounting, connecting or operating his self-contained battery-operated safety light to be compliant with the regulations in UL 1994. Particularly, his EL lamp system is not connected to the building power grid or building fire alarm system. As such, it will not respond to a building emergency or power outage and can not stay on for the requisite 90 minutes on a battery back-up system because he does not disclose a battery back-up system.

With regard to claim 20, Chien does not disclose the intent or method for using EL safety lighting for directly illuminating the floor of an egress pathway. Instead, he relies on mounting the fixture directly to the floor and uses the direct illumination of his system as a way to navigate to an exit. Applicants have shown above that using a hodge-podge of his battery-operated self-contained EL illuminated subsystems does not constitute a reliable or commercially viable building emergency egress lighting system and the failings of his PL system have also been discussed. A person of ordinary skill in the art could not modify Chien's system so that if would provide indirect floor lighting as specified by UL 924.

With regard to claim 21 Chien does not disclose the intent or method to make a EL safety light of indeterminate length because he can not. Applicants have shown that the EL lamps available to Chien are screen-printed parallel plate EL lamps that have size restrictions. In addition, there are size restrictions due to the low efficiency power supply design and the high cost of increasing the size of the batteries. Chien does disclose mounting EL strips on a PL panel, which could possibly increase the maximum size of each subsystem, but this incurs a high labor cost of mounting individual EL strips on every PL panel and making multiple connections. This would decrease the system reliability due to multiple connections and the maximum size would be increased marginally because of the power constraints.

Using the 100 mA maximum current constraint (Chien '016, col 4, line 2), Applicants calculate the largest lamp size at 0.09mA/cm2 is 172 square inches. Applicants estimate the largest potential fixture utilizing Chien will be some where between 5 – 15 feet in length using an number of smaller EL strips pieced together and assuming other technical issues can be resolved. If one wants to utilize Chien as a safety system for an entire building, with a potential for thousands of feet of passageways, this becomes unworkable. The EL lamp material contemplated in Applicants' invention is manufactured on 1200 foot continuous coils and can be sent out to customers in finished coils of 300 feet or more, making it a viable lamp system for lighting passageways for an entire building.

With regard to claim 22 Chien discloses a low level exit sign that is not compliant with UL 924 or UL 1994. As such, Chien's self-contained system is not connected to the building power grid or the building fire/emergency system and therefore cannot come on in time of a

building emergency or power outage. In this context, Chien does not teach, suggest or disclose the intent or method to have an exit sign, which is either reliably on all the time or triggered simultaneously with the emergency lighting system. It can not be reliably on all the time because Chien excludes connecting his system to the building power grid and is therefore dependent on a self-contained battery-operation. In addition, Chien makes no provision for a battery back-up system, thus the existing on-board batteries must be frequently changed. The conclusion one draws is, the EXIT sign that Chien discloses is not a viable system, because it can not be on all the time for reasons of battery life and lamp life, and it can not be triggered to come on in a building emergency or power outage, without operator intervention, because there is no disclosed connection to the building systems.

Applicants submit that claims 19 - 22 are patentable over the combination of the Chien '960 and'016 patents for similar reasons as independent claim 18 as amended and further for additional limitations not recited in claim 18.

In addition to the above, the various applied prior art references offer no teaching which would prompt the artisan of ordinary skill to make the combinations/modifications proposed by the Examiner. In fact, it is only when the Examiner looks to applicants' own disclosure that he can allege obviousness by choosing bits and pieces of the prior art references and then combining these bits and pieces together based on alleged obviousness. Without a teaching (other than applicants' own teaching) to prompt the combinations/modifications, the rejections are merely improper hindsight reconstruction of applicants' own invention using applicants' own disclosure. The Court of Appeals for the Federal Circuit has steadfastly criticized such

modification. "The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). See also, e.g., In re Laskowski, 871 F.2d 115, 10 USPQ 2d 1397 (Fed. Cir. 1989); Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985); In re Grabiak, 769 F.2d 729, 731, 226 USPQ 870, 872 (Fed. Cir. 1985); In re Sernaker, 701 F.2d 989, 994, 217 USPQ 1, 5 (Fed. Cir. 1983).

Accordingly, it is submitted that the present invention as claimed is readily distinguishable from the prior art references for the reasons indicated. Applicants' invention is not disclosed by any of the prior art and there is no fair basis for alleging that applicants' invention is obvious in regard to such prior art. If the invention was obvious, it would have been adopted before in view of its advantages.

Allowable Subject Matter

The Examiner indicates that claims 23-34 are objected to as being dependent upon a rejected based claim but would be allowable if rewritten in independent form including all the limitations of the base claim and intervening claims. The Examiner admits the prior art fails to suggest a power means comprising an EL power supply having an input coupled to the line side of an electrical switch supplying commercial AC and to the DC voltage source in the absence of AC power at the line side of the electrical switch as required in claims 23 and 35 or a self diagnostic testing means detecting electrical short circuit and an electrical open circuit of an EL panel as required in claims 25 and 36-38. Claim 25 has previously been rewritten in independent

form as new claim 37 which includes limitations of the base claim 18 from which it depends. The subject matter of claim 23 has been added to independent claim 18 from which it depends and is rewritten above. The dependencies of the remaining claims of the application have been amended as indicated above to properly refer to the claims from which they depend.

In sum, it is submitted that the present invention as claimed is readily distinguishable from the applied references for the reasons indicated. Applicants' invention is not disclosed by the applied references and there is no fair basis for alleging that applicants' invention is obvious in regard to them. If the invention was obvious, it would have been adopted before in view of its advantages.

Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that all the claims are allowable and early favorable action is earnestly solicited. The Examiner is invited to call Applicants' attorney if any questions remain following review of this response.

Respectfully submitted,

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Table 40.6
Minimum luminance and uniformity

Table 40.6 effective August 1, 1998

Mode of operation[a]	Minimum luminance	Uniformity: Letter or directional indicator	Uniformity: Entire sign[b]
Normal	2.50fl / (8.57cd/m²)	20:1	50:1
One minute	2.50fl / (8.57cd/m²)	20:1	50:1
End of rated time (ERT)	1.50fl / (5.14cd/m²)	20:1	50:1

[a] As defined in 40.1.5.

[b] As defined in 40.7A.3.3.

40.7A.3 Uniformity

40.7A.3.1 The uniformity ratio shall be determined using the measurement system described in 40.7A.4.1 and 40.7A.4.2 for the areas specified in 40.7A.3.2 and 40.7A.3.3.

40.7A.3.1 effective August 1, 1998

40.7A.3.2 Uniformity of the letters or directional indicators shall be determined on the individual letters or directional indicators under the conditions specified in 40.1.5 and shall be in accordance with Table 40.6. The uniformity ratio represents the maximum to minimum luminance.

40.7A.3.2 effective August 1, 1998

40.7A.3.3 Uniformity of the entire sign shall be determined as a ratio of the maximum to minimum luminance for the following areas:

a) Across the directional indicator(s) (if provided) and all of the letters and

b) Across the background as shown in Figure 40.9A.

40.7A.3.3 effective August 1, 1998

Table 40.5
Contrast ratios for directional indicators having illuminated borders

Table 40.5 effective May 21, 1999

Contrast ratio	Measurement points		
	Figure 40.6	Figure 40.7	Figure 40.8
C1	D1 – D5 and B24 – B31	27 – 33 and B24 – B31	D1 – D5 and B24 – B31
C2	34 – 39 and B24 – B31	DB1 – DB6 and B24 – B31	b37 – b43 and B24 – B43
NOTE – Average luminance values at the specified measurement points that are to be used for calculation of the contrast ratio.			

40.7A Analytical luminance visibility test

40.7A.1 General

40.7A.1.1 The Analytical Luminance Visibility Test is specified in 40.7A.2.1 – 40.7A.2.2 and 40.7A.3.1 – 40.7A.3.3. The luminance measurement points shall be determined in accordance with 40.7A.4.1 and 40.7A.4.2.

40.7A.1.1 effective August 1, 1998

40.7A.2 Minimum luminance level

40.7A.2.1 The minimum luminance of an exit sign legend shall be as specified in Table 40.6 on the letters for stencil face signs, and on the background or letters, whichever is brighter, for open (panel) face signs. For edge lit signs, the minimum luminance shall be determined on the letters or background, whichever is brighter, and shall not include the illuminated border, if provided.

Exception: For exit signs having illuminated borders that are the same illuminated color as the stroke, (for example a red light source illuminating a red legend and border, not a white light source illuminating a red legend and a clear or frosted border as the legend would be red and the border would be white) the border can be considered as part of the stroke if the contrast ratio is no more than 0.20 between the border and the stroke.

Revised 40.7A.2.1 effective August 1, 1998

40.7A.2.2 The minimum luminance shall be as specified in Table 40.6 on the directional indicators, if provided, for stencil face signs, and on the background or directional indicators, whichever is brighter, for open (panel) face signs. For edge lit signs, the minimum luminance shall be determined on the directional indicators or background, whichever are brighter, and shall not include the illuminated border, if provided.

Exception: For exit signs having illuminated borders that are the same illuminated color as the stroke, (for example a red light source illuminating a red legend and border, not a white light source illuminating a red legend and a clear or frosted border as the legend would be red and the border would be white) the border can be considered as part of the stroke if the contrast ratio is no more than 0.20 between the border and the stroke.

Revised 40.7A.2.2 effective June 1, 2001

Analytical data for LUNA Products

	Lunaplast	Zinc Sulphide
Chemical Composition	SrAl	ZnS:Cu
Excitation color	Pale yellow-green	Pale yellow-green
Emission color	Yellowish-green	Yellowish-green
Excitation spectrum	200-450 nm	200-450 nm
Peak excitation	360 nm	360 nm
Peak emission	520 nm	530 nm
Luminance @ 10 minutes	150-300 mcd/m2	10-20 mcd/m2
Luminance @ 60 minutes	34.8	0.07
Luminance @ 120 minutes	15.0	0.022
Excitation @ 120 minutes	5-10 minutes max	3-5 minutes

Photometric analysis conducted by the: The National Research Council (NRC)

Table 1
Luminance decay of LUNAplast™ sample
after various excitation conditions.
(units = milicandela·m-2)

Excitation Condition						
	Xenon Lamp		Fluorescent lamp		Fluorescent lamp	
Excitation time	1000 lux		500 lux		200 lux	
	LUNA	Zns	LUNA	Zns	LUNA	Zns
1 min	2480	202	1160	149	680	N/A
10 mins	262	9	189	8	154	N/A
60 mins	34.8	.07	30.8	.59	28.3	N/A
120 mins	15.0	.022	14.3	.019	13.5	N/A

320 mins	4.5	N/A	4.6	N/A	4.5	N/A

LUNAplast™ v. Leading Marine Grade Zinc Sulphide Material
Comparative Brightness and Decay Test

Two samples of photoluminescent material were tested:

1. LUNA Technologies International's "LUNAplast™"

2. Leading Zinc-Sulphide Manufacturer's Marine Grade Material (ZnSMG).

The time decay of luminance for each sample was measured for eight hours after being exposed to three different lig

1. Five minute exposure at 1000 lux from a Xenon lamp.

2. Twenty-four hour exposure at 500 lux from a 2700K (nominal) fluorescent lamp.

3. Twenty-four hour exposure at 200 lux from a 2700K (nominal) fluorescent lamp.

FLATLITE Illuminance

FLATLITE Configuration	Location of Measurement	Footcandles	Lux
0.25" strip, horizontal mount 6" above floor	2" away from light source	0.7	8
	6" away from wall on the floor	0.12	1.4
	24" away from wall on the floor	0.06	0.6
0.25" strip, horizontal mount 6" above floor plus EL backlit Exit sign through Green lens	6" away from wall on the floor	0.41	4.4
Charging LUX conditions for Photoluminescent			
Standard Flourescent 2'x2' drop ceiling	directly under light on wall 6" above the floor		150
	2 feet further horizontally		100
	around a corner in hallway 6' away		50
Standard 2' x 4' double bulb drop flourescent	on desk directly below		600

Does your photoluminescent material meet the current ASTM Safety Markings Standards?

ASTM E 2072-00 STANDARD SPECIFICATION FOR PHOTOLUMINESCENT SAFETY MARKINGS (4.1 luminance in test lab)

The luminance of the photoluminescent markings in compliance with

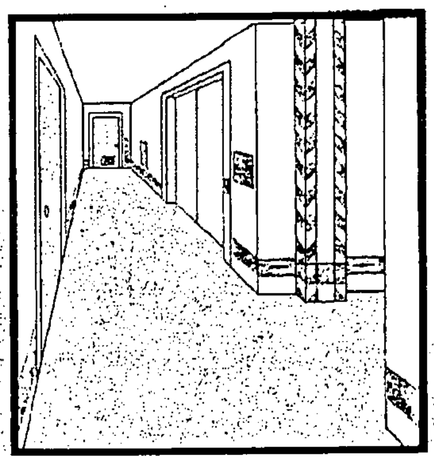
ASTM Test Method E 2073-00, shall not be less then:

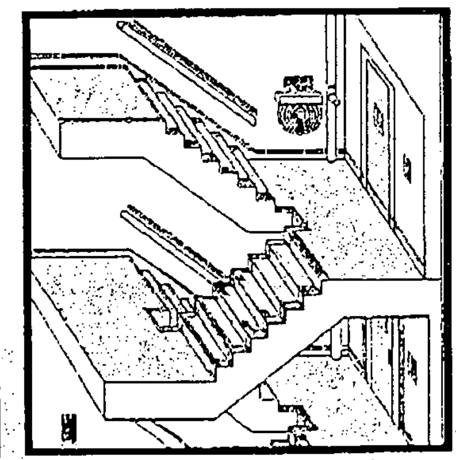
20.0 mcd/m^2 10 minutes after activation has ceased

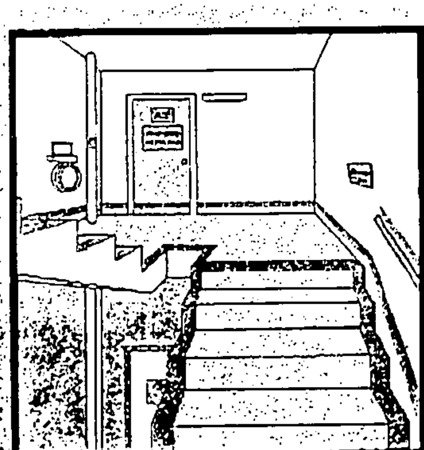
2.8 mcd/m^2 60 minutes after activation has ceased

Glo Brite® 7520 & 7530 exceed the current ASTM standard:

	ASTM Standard	Glo Brite® 7520	Glo Brite® 7530
10.0 min.	20.0 mcd/m^2	30.0 mcd/m^2	51.0 mcd/m^2
60.0 min.	2.8 mcd/m^2	4.0 mcd/m^2	7.5 mcd/m^2







Illustrations represent the ASTM standard E 2030-99: (GUIDE FOR RECOMMENDED USES OF PHOTOLUMINESCENT SAFETY MARKINGS)

GLO BRITE® 7530 SAMPLE

GLO BRITE® 7520 SAMPLE

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Glo Brite® Setting the Safety Standard